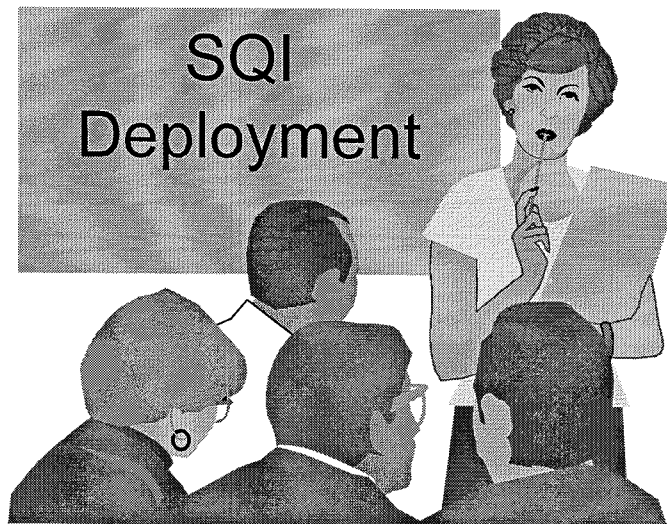


# Topics to be Covered



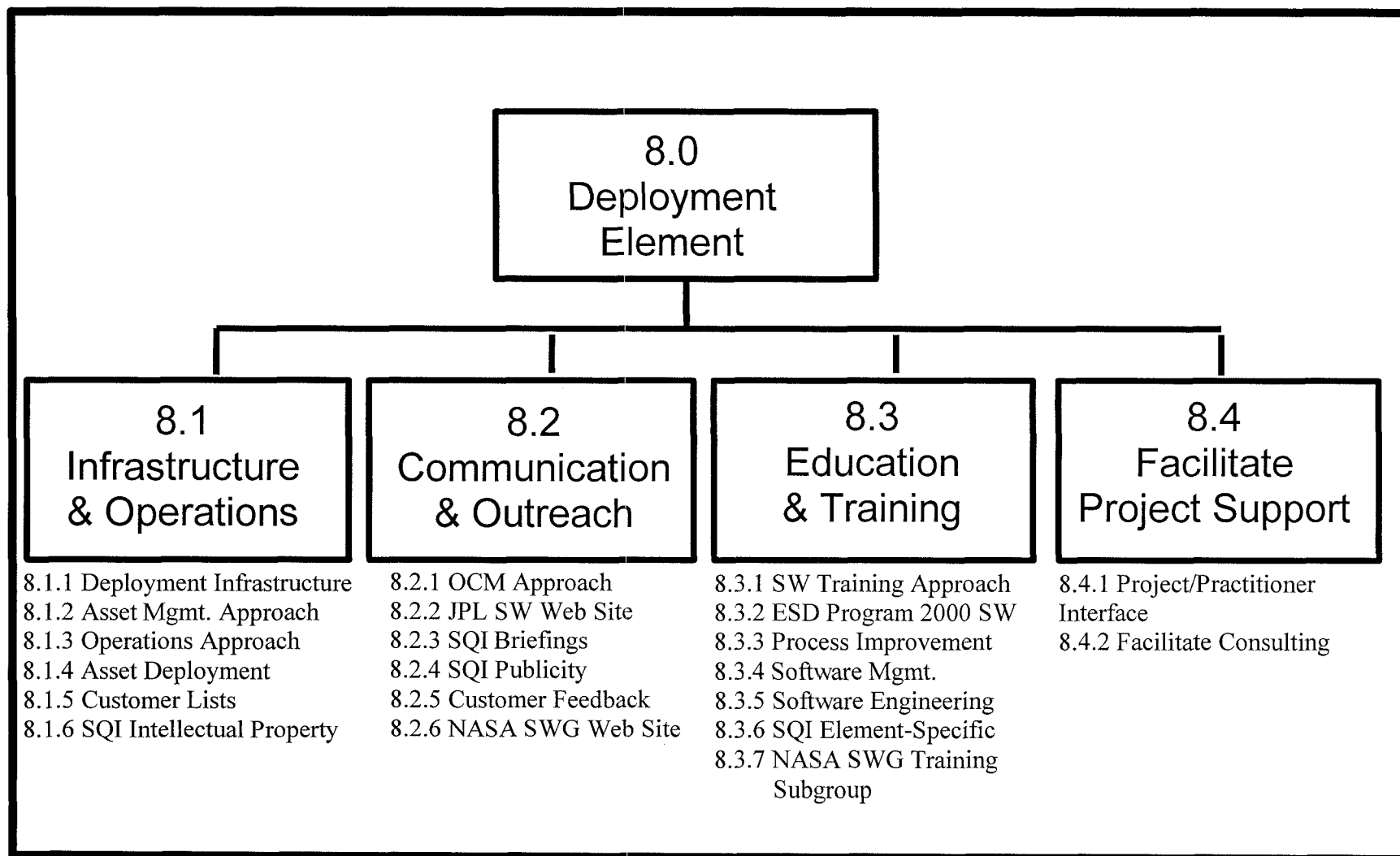
- ◆ SQI Deployment Approach
- ◆ Deployment Responsibilities
- ◆ Progress and Lessons Learned
  - Education and Training
  - Communications and Outreach
  - Operations and Infrastructure
  - Project Support
- ◆ Organizational Change Mgmt. Concepts and Approach
- ◆ Deployment Element Activities

# SQL Deployment Approach



- ◆ Actively promote **organizational change management**.
- ◆ Provide the **infrastructure and operations** support to facilitate deployment activities.
- ◆ Interactively **communicate** with the project and practitioner communities about SQL activities, and promote and publicize knowledge about products, processes and events.
- ◆ Provide **education and training** in the areas of process improvement, software management, software engineering, DSP processes, products, practices, metrics and tools.
- ◆ Enable and promote software best practices, and leverage JPL experience in software engineering by providing **project support** to major software efforts throughout the entire software life-cycle.

# Deployment Work Breakdown Structure



# Deployment Responsibilities (1)



## 8.1. Infrastructure & Operations Components

- ✦ 8.1.1 Deployment Infrastructure
  - 8.1.1.1 CM-Controlled Electronic Library (MCDL?)
  - 8.1.1.2 DMIE/Rules! Content Maintenance
  - 8.1.1.3 Problem Management Tool, reports, analysis
  - 8.1.1.4 Configuration Management Tool, CCB
- ✦ 8.1.2 Asset Management Approach (*Deployment Approach*)
- ✦ 8.1.3 Operations Approach
- ✦ 8.1.4 Asset Deployment/Operations
- ✦ 8.1.5 Customer Lists
- ✦ 8.1.6 SQI Intellectual Property Issues (External Release)

## 8.2 Communication and Outreach Components

- ✦ 8.2.1 OCM Approach
  - 8.2.2 JPL Software Web Site
    - 8.2.2.1 *Software Web Site Content Preparation*
    - 8.2.2.2 Software Web Site Development/Maintenance
- ✦ 8.2.3 SQI Briefings
  - 8.2.3.1 SQI Project Briefings
  - 8.2.3.1 *Technical/Awareness Briefings*
- ✦ 8.2.4 Publicity
- ✦ 8.2.5 Customer Feedback Mechanisms
  - 8.2.5.1 Customer Clearinghouse – Potential Opportunities, Annotated List, Marketing Leads
  - 8.2.5.2 *Problem Resolution*
- ✦ 8.2.6 NASA SWG Web Site

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Legend:  
Black = Deployment Element  
*Blue italics* = Other SQI Elements



# Deployment Responsibilities (2)



## 8.3 Education and Training Components

- ✦ 8.3.1 Software Training Approach & Ops
  - 8.3.1.1 Course Planning/Curriculum Development
  - 8.3.1.2 Classroom/Registration Mgmt.
  - 8.3.1.3 Training Evaluations, Metrics
- ✦ 8.3.2 ESD Program 2000 Software Modules
  - 8.3.2.1 *Course Content Development*
  - 8.3.2.2 Content Review
  - 8.3.2.3 *Classroom Instruction*
- ✦ 8.3.3 Process Improvement
- ✦ 8.3.4 Software Management (*content dev., inst.*)
- ✦ 8.3.5 Software Engineering (*content dev., inst.*)
- ✦ 8.3.6 SQI Element-Specific (*content dev., inst.*)
- ✦ 8.3.7 NASA SWG Strategy 4 Subgroup (Training)

## 8.4 Project Support Components

- ✦ 8.4.1 Project/Practitioner Interface
  - 8.4.1.1 SQI Project Points of Contact (POCs) – inbound untargeted queries,
  - 8.4.1.2 Help Desk, Maintain FAQs, Generate FAQs Answers
  - 8.4.1.3 Subject Matter Expert (SMEs) List (Line Management Role)
- ✦ 8.4.2 Project Consulting
  - 8.4.2.1 Facilitate Project Consulting
  - 8.4.2.2 *Answer Simple Questions (< 2 hr.)*
  - 8.4.2.3 *In-depth Consulting (several days or weeks)*

Legend:

Black = Deployment Element

*Blue italics* = Other SQI Elements

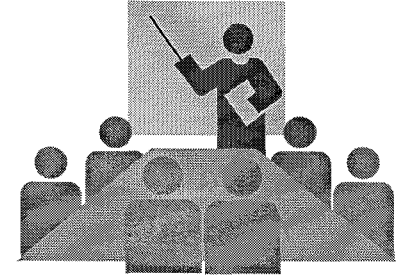
# Progress and Lessons Learned (1)



## ♦ Education and Training

### Progress:

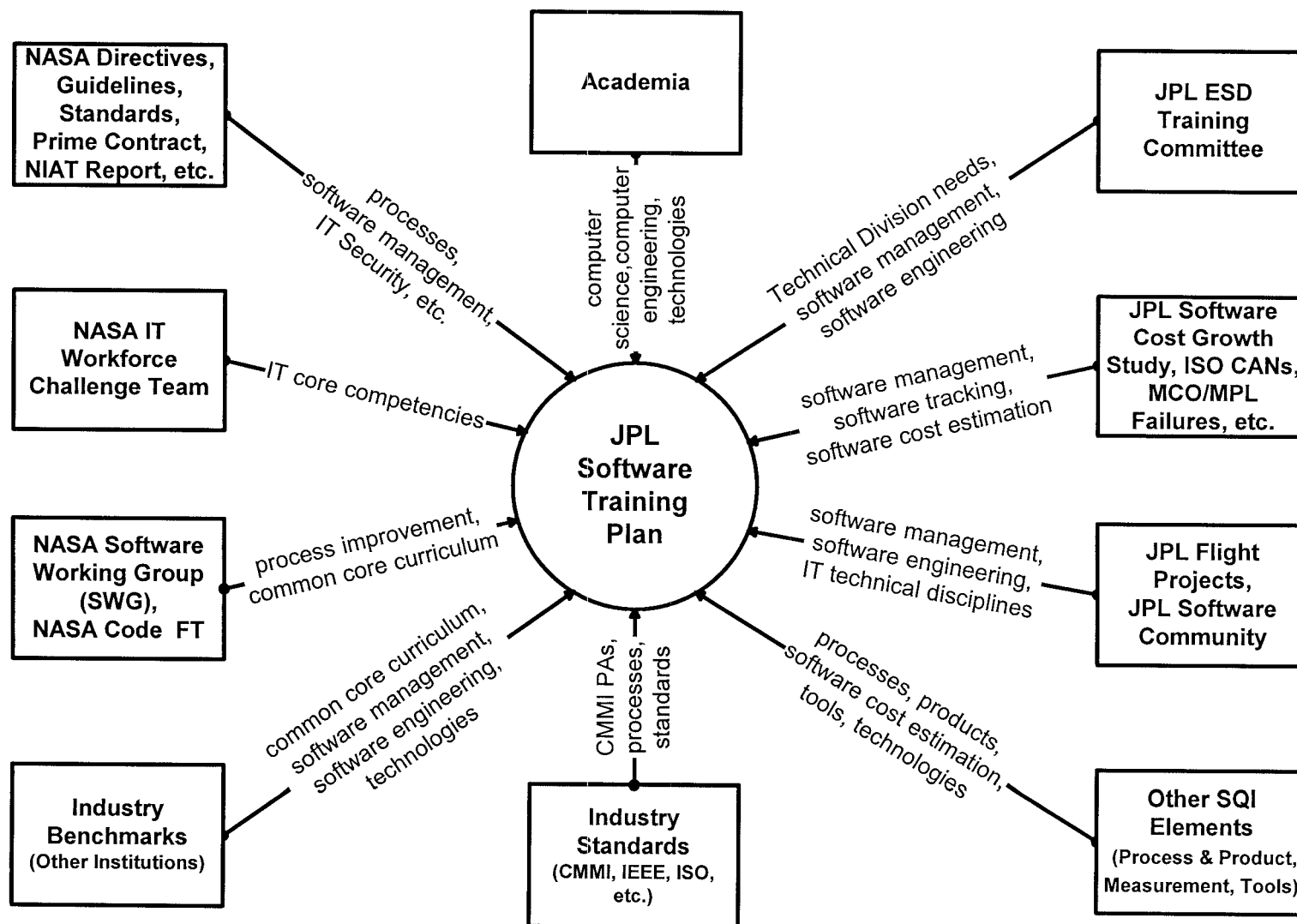
- Generated a JPL Software Training Plan that addresses the CMM Level 3 Training Program KPA
  - ♦ Coordinated plan with all software training providers on lab
- Offered courses in Overview of CMMI, Intro. to CMMI, *MPI*
- Created courses for Software Management and Software Engr.



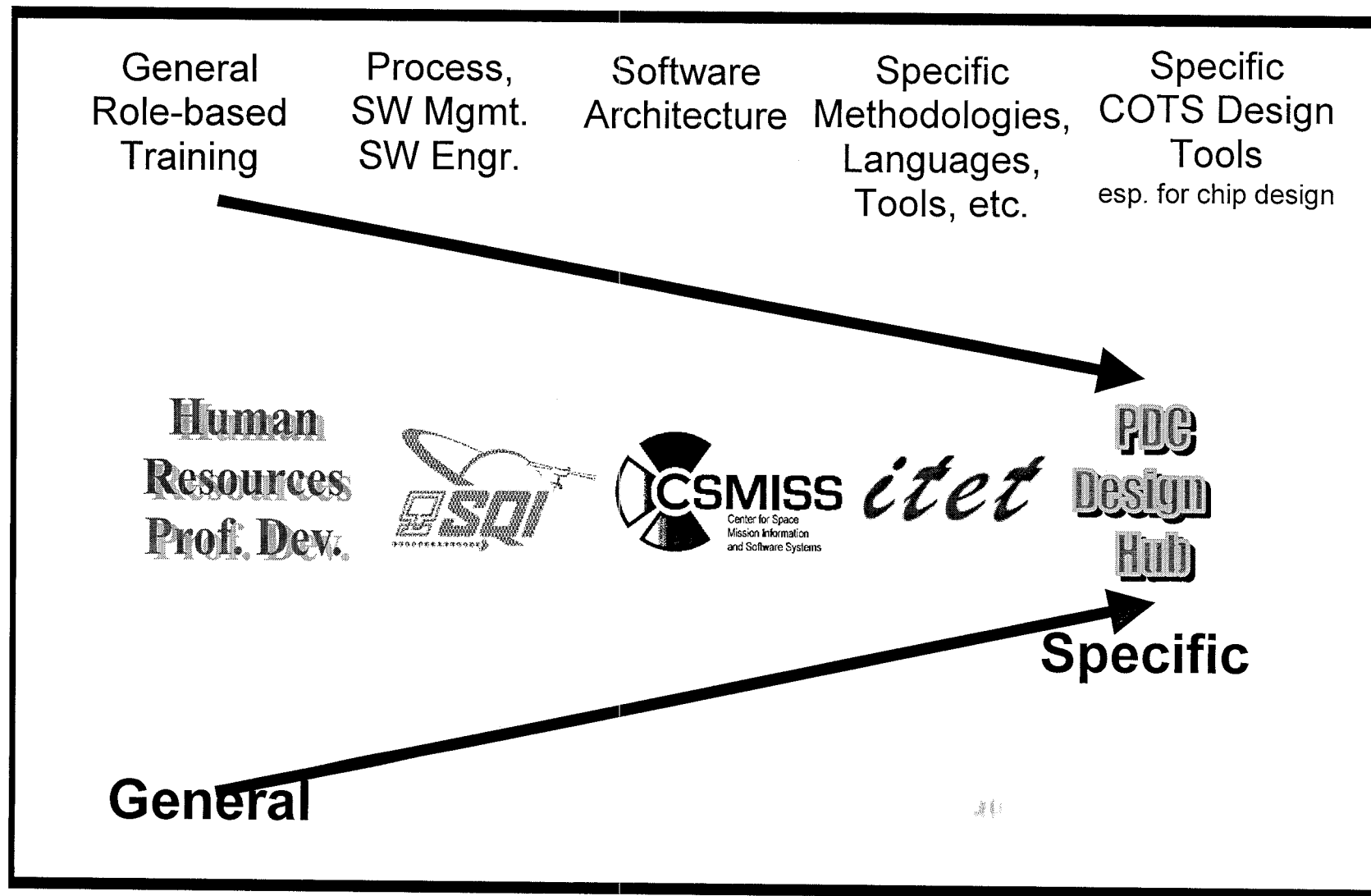
### Lessons Learned:

- Don't limit the scope of the plan to the software initiative only, otherwise you will not comply with the Training Program KPA.
- Be sure to train all relevant stakeholders in CMMI.
- Need dual emphasis for managers and practitioners.

# Sources of Training Requirements



# Roles of JPL Training Providers





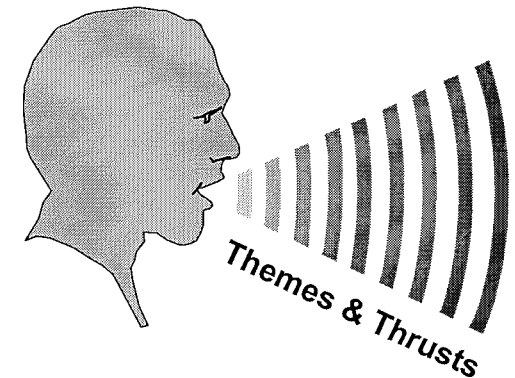
## Progress and Lessons Learned (2)



### ♦ Communications and Outreach

#### Progress:

- Initial Operating Capability (IOC) of JPL Software Web Site delivered on May 6, 2002 (<http://software.jpl.nasa.gov>)
- Developed SQL Project Briefing package to give an overview.
- Developed Communications Log Sheet to “capture” issues from presentations, and to record audience reached.



#### Lessons Learned:

- Users prefer an “index style” structure for the Home Page, and there are design implications -- Scrolling vs. Pull-down menus
- Need different “flavors” of presentations for different stakeholders
- Need tracking mechanisms to “capture” customer interactions, but some are reluctant to take the time to complete them.

# JPL Software Web Site Home Page



## Software Practices

- Flight Project Software Practices
- Flight Project Software IV & V Practices
- Design Principles
- Develop Software Products (DSP)  
Process Requirements
- Waivers

## Resources

- Checklists & Forms
- Engineering Models
- Handbooks
- Reference Material
- Sample Documents
- Software Tool Catalog
- Standards and Guidelines
- Templates

## Services & Support

- Communications & Presentations
- Consulting & Project Support
- Metrics Consulting & Analysis
- News Groups
- Software Assessments
- Software Tool Service
- Subject Matter Experts (SMEs)

## Education & Training

- Conferences
- Seminars
- Training Courses
- Workshops

## Required Activities

### Management Activities

- Software Management & Development Planning
- Software Cost Estimation
- Software Risk Management
- Software Supplier Agreement Management
- Software Development Monitoring & Control
- Software Configuration Management

### Engineering Activities

- Software Requirements Development & Management
- Software Design
- Software Implementation
- Software Delivery
- Software Maintenance

### Verification & Validation (V&V) Activities

- Software Process & Product Verification
- Software Reviews
- Software Integration and Testing

## Other Sites of Interest

## LATEST NEWS

### New SQI Project Manager

On 02/25, Frank Kuykendall will officially return to JPL as the new SQI Project Manager...  
[MORE>](#)

### D. Nichols Leaves SQI

David Nichols moves on to become the Div 36 Assistant Division Manager for Flight Projects. David will retain his role as JPL Software Process Owner and SEMOG chair for now...  
[MORE>](#)

## Progress and Lessons Learned (3)



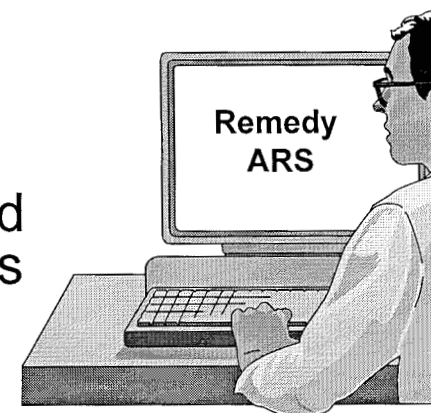
### ♦ Infrastructure and Operations

#### Progress:

- Selected Remedy ARS for Customer Support and designed schema to match products and services on Web Site

#### Lessons Learned:

- SQL Assets need to be under CM control before being deployed.



### ♦ Project Support

#### Progress:

- Delineated responsibilities for providing actual project support vs. infrastructure to support and facilitate it.

#### Lessons Learned:

- It's best to just facilitate the process and leave the actual instruction and consulting sessions to the experts.



# Support to Projects and Programs



## Type of Support Provided

## Known Users

### ◆ Consulting

- Cost/risk estimation
- Metrics
- Defect classification
- Use of IV&V for software

MER, ST-6  
MER, MONTE, TMOD  
MER  
MER

### ◆ Software Document Templates

- Software Management Plan
- Software Requirements Doc.
- Release Description Doc.

Deep Impact, Europa Orbiter, MER,  
MRO/Electra, Project Support Office  
MRO/Electra, SMEX/STEP, ST-6  
MDS

### ◆ Coding Standards

DSN-Madrid

### ◆ Software Development Tools

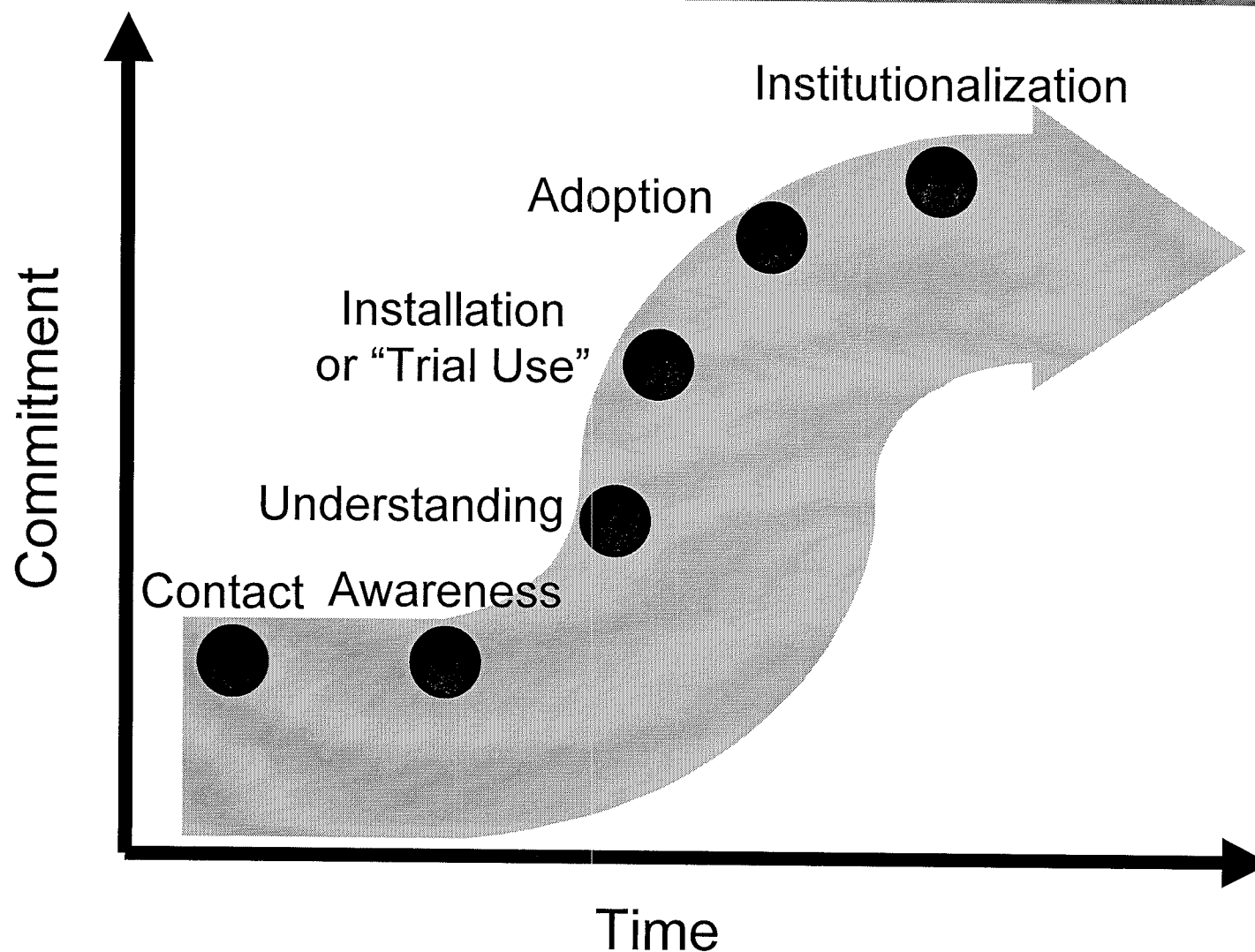
- *Evaluation and demos*
- *Operational tool service*

MER, others  
Clarity, Deep Impact, Electra, IMMACS,  
Keck Interferometer, Laser Radar Mapper,  
Low Temp. Physics Microgravity, MDS,  
MER, Planetary Robotics Lab, ST-6

### ◆ Software Stress Testing Hdbk

Deep Impact

# How Individuals Commit to Change



# Technology and Change Adoption Categories



## ♦ Innovators

- Will settle for buggy or difficult-to-use solution components; are accustomed to finding their way around the glitches.

## ♦ Early Adopters and Early Majority

- Can see the strategic advantage of the improvement or change and are willing to help the organization get there.

## ♦ Late Majority

- Need a lot of support to adopt the solution component.

## ♦ Laggards

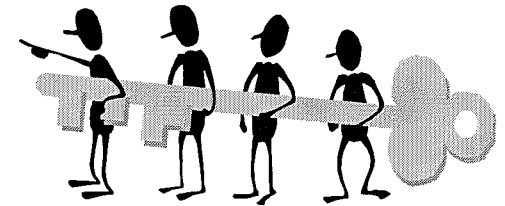
- Are very resistant to changing the status quo, despite the effectiveness of the solution component.

# Change Management Approach



## ♦ Generate an SQL Organizational Change Management (OCM) approach that defines the following:

- Change management strategies
  - ♦ Plans to move up the OCM curve
- OCM training for SQL Team & JPL Sr. management
- Infusion goals and change acceptance time lines
- Themes and thrusts
- Key stakeholders and segments
- Communications vehicles
- SQL logos and tag lines
- Interactions amongst the SQL elements and other process improvement activities to achieve the changes.





# The JPL Software Community



## ✦ Flight Software Applications

- Fault Protection
- Guidance, Flight Navigation, Control (GNC)
- Command and Data Handling (C&DH)
- Science Instrument Software

## ✦ Science Software Applications

- Science Data Processing
- Science Analysis
- Science Data Archive Systems

Red = Mission-Critical Software

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## ✦ Ground Software Applications

- DSN Monitor and Control
- Telecommunications
  - ✦ e.g., Telemetry, Tracking, Command, Data Mgmt., Uplink, Downlink
- Mission Services & Applications
  - ✦ e.g., Mission Planning, Sequence Design, Mission Control, Flight Engineering
- Tracking and Navigation
  - ✦ e.g., SPICE, MAS, MONTE
- Antennas and Microwave
- Spacecraft Simulation (SIM)

## ✦ Other Applications

- EIS Infrastructure (services)
- New Business Systems (NBS)
- Reimbursable Systems
- Technology and R&D

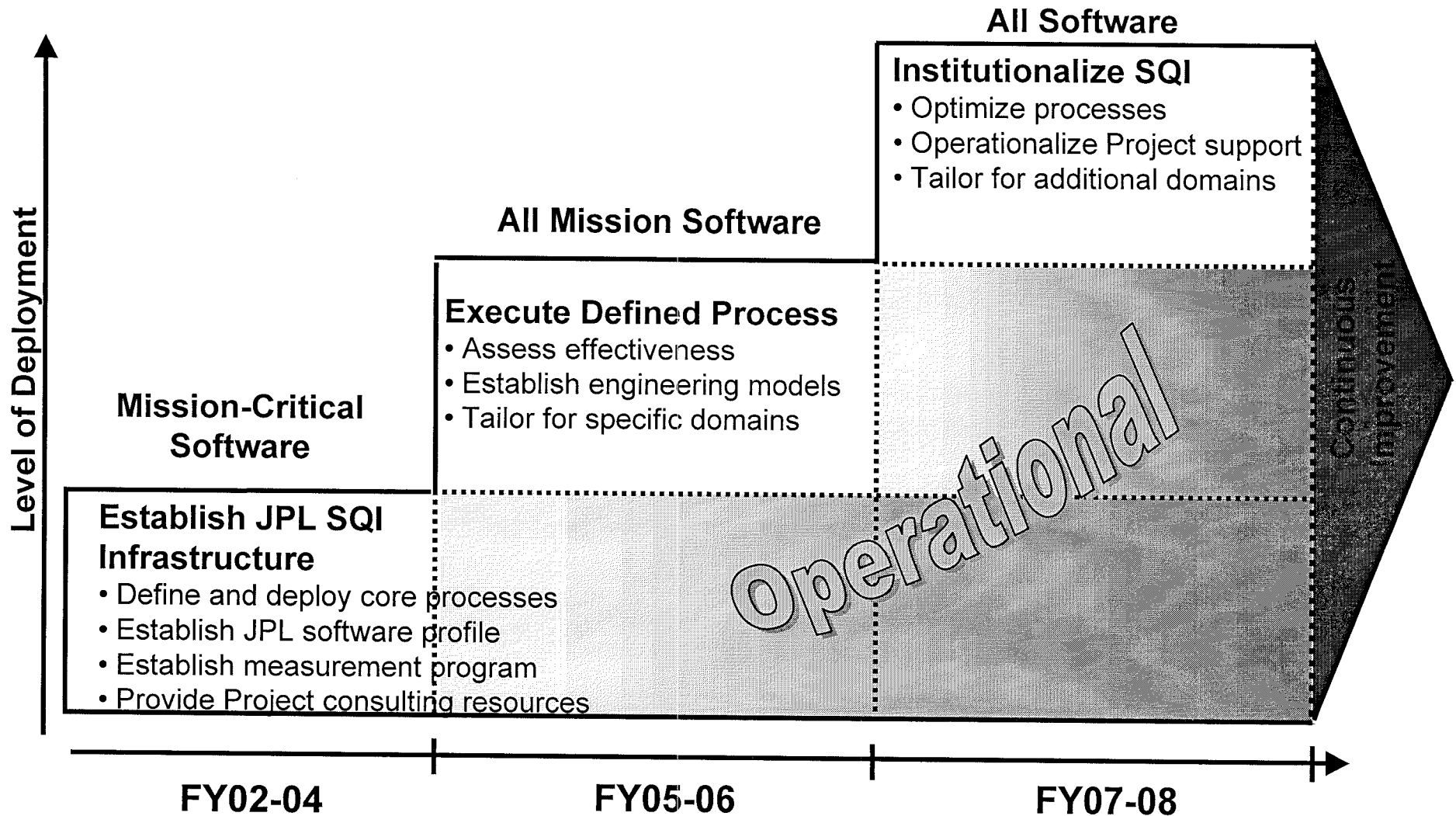
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# Capability Maturity Model Integrated

Level	Focus	CMMI Process Areas	Category
<b>5 Optimizing</b>	Continuous Process Improvement	Organizational Innovation and Deployment (OID) Causal Analysis and Resolution (CAR)	Process Mgmt. Support
<b>4 Quantitatively Managed</b>	Quantitative Management	Organizational Process Performance (OPP) Quantitative Project Management (QPM)	Process Mgmt. Project Mgmt.
<b>3 Defined</b>	Process Standardization	Requirements Development (RD) Technical Solution (TS) Product Integration (PI) Verification (Ver) Validation (Val) Organizational Process Focus (OPF) Organizational Process Definition (OPD) Organizational Training (OT) Integrated Project Management for IPPD (IPM) Risk Management (RSKM) Integrated Teaming (IT) Integrated Supplier Management (ISM) Decision Analysis and Resolution (DAR) Organizational Environment for Integration (OEI)	Engineering Engineering Engineering Engineering Engineering Process Mgmt. Process Mgmt. Process Mgmt. Project Mgmt. Project Mgmt. Project Mgmt. Project Mgmt. Project Mgmt. Support Support
<b>2 Managed</b>	Basic Project Management	Requirements Management (REQM) Project Planning (PP) Project Monitoring and Control (PMC) Supplier Agreement Management (SAM) Measurement and Analysis (MA) Process and Product Quality Assurance (PPQA) Configuration Management (CM)	Engineering Project Mgmt. Project Mgmt. Project Mgmt. Support Support Support
<b>1 Initial</b>			

# SQL Implementation Phasing

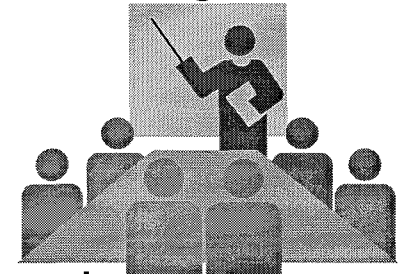


# Backup Slides

# ***Education and Training Activities***



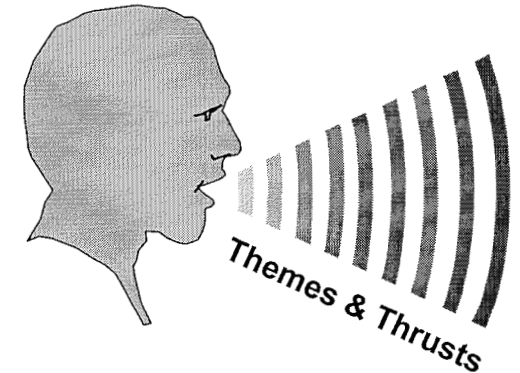
- ✦ Define the Software Training approach in a JPL Software Training Plan.
  - Training strategy, courses offered, frequency and schedule
- ✦ Continue to support the ESD Program 2000 role-based training courses
  - Software modules for PMs, PEMs and Cog Es.
- ✦ Coordinate with NASA Code FT and CSM regarding offering process improvement courses at JPL.
- ✦ Promote and conduct the Software Management & Planning course.
- ✦ Promote and conduct the new Software Product Engineering course.
- ✦ Coordinate with HR Professional Development Technical Training and ITET regarding software training requirements and course offerings
- ✦ Develop training needed by other SQI Elements
  - Tools and Techniques, Metrics, Cost Estimation, Processes, etc.
- ✦ Support the NASA SWG Strategy 4 (Training) Subgroup



# Communications Activities



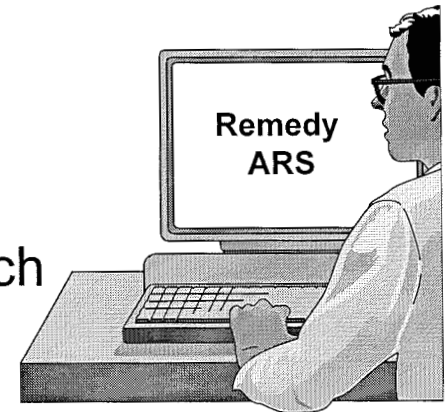
- ✦ Define and implement the SQL OCM approach.
- ✦ Generate the SQL Communications Plan.
- ✦ Develop and maintain the JPL Software Web Site.
- ✦ Develop SQL Briefings
  - “Road Show”, technical, awareness)
  - Package for the SEMOG to use to communicate with TGSs & PEMs.
- ✦ Generate publicity materials and publicize via various media.
- ✦ Actively seek customer feedback and “capture” customer interactions
  - User surveys, user forums, Web suggestions, customer contact record, communications logs, etc.
- ✦ Provide on-going Web Support for the NASA SWG.



# Operations and Infrastructure Activities



- ✦ Develop SQL Deployment Infrastructure
  - Configuration Management, Problem Management
  - Electronic Library, DMIE/JPL Rules! Interface
- ✦ Define SQL Asset Deployment Management Approach
- ✦ Define SQL Operations Approach
- ✦ Deploy SQL Assets
  - Publish new DSP standards on DMIE/JPL Rules!
    - ✦ Process Description Document, Develop Software Products (formerly DSP Policy)
    - ✦ Procedures for Mission-Critical Software
    - ✦ Software Design Principles (*upon approval by PEMC*)
  - Ensure SQL Assets are under CM Control
- ✦ Maintain Customer Lists (Project, Line, Interest Areas)
- ✦ Coordinate SQL Intellectual Property (IP) Issues



## ***Facilitate Project Support Activities***



- ◆ Serve as SQL POC and direct requests to SQL Experts.
- ◆ Establish network of Subject Matter Experts (SMEs) to assist projects in deploying SQL products.
- ◆ Maintain list of Frequently Asked Questions (FAQs)
- ◆ Provide HelpLine Support
- ◆ Facilitate consulting support to JPL projects.



# Deployment Management and Planning Activities



- ♦ Define scope, schedule and budget for the SQL Deployment Element.
  - Work Breakdown Structure (WBS) and WBS Dictionary
  - Work Agreement and WAMs for FY 2002
  - Level 3 schedule in MS Project and FastTrack
  - Budget in RMS FFE and NBS BDE
- ♦ Track and Report Deployment Element Activities
  - Generate MMR and Quarterly Report presentations
  - Collect and analyze DE and customer metrics
- ♦ Coordinate with other SQL Elements & SQL Project Engr.
  - Review their work agreements and work products, and meet with element leads to develop and coordinate plans for deploying them.
- ♦ Coordinate with external entities
  - SEMOG, HR Prof. Dev., ESD Program 2000, ITET, CSM, NASA SWG, NASA Code FT, SQA, Formulation Phase Support Team, JPL Rules!, EPSPO, CSMISS, MDS, etc.

